

Document made available under the Patent Cooperation Treaty (PCT)

International application number: PCT/US05/021427

International filing date: 17 June 2005 (17.06.2005)

Document type: Certified copy of priority document

Document details: Country/Office: US
Number: 60/581,257
Filing date: 18 June 2004 (18.06.2004)

Date of receipt at the International Bureau: 08 August 2005 (08.08.2005)

Remark: Priority document submitted or transmitted to the International Bureau in compliance with Rule 17.1(a) or (b)



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1350573

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July 27, 2005

THIS IS TO CERTIFY THAT ANNEXED HERETO IS A TRUE COPY FROM THE RECORDS OF THE UNITED STATES PATENT AND TRADEMARK OFFICE OF THOSE PAPERS OF THE BELOW IDENTIFIED PATENT APPLICATION THAT MET THE REQUIREMENTS TO BE GRANTED A FILING DATE.

APPLICATION NUMBER: 60/581,257

FILING DATE: *June 18, 2004*

RELATED PCT APPLICATION NUMBER: *PCT/US05/21427*



Certified by

Under Secretary of Commerce
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and Director of the United States
Patent and Trademark Office

SYSTEM AND METHOD OF MANAGING AND MONITORING CLUSTER AND GRID RESOURCES

BACKGROUND OF THE INVENTION

1. Field of the Invention

[0001] The present invention relates to a resource management system and more specifically to a system and method of managing and monitoring cluster resources.

2. Introduction

[0002] Managers of clusters desire maximum return on investment often meaning high system utilization and the ability to deliver various qualities of service to various users and groups. A cluster is typically defined as a parallel computer that is constructed of commodity components and runs as its system software commodity software. A cluster contains nodes each containing one or more processors, memory that is shared by all of the processors in the respective node and additional peripheral devices such as storage disks that are connected by a network that allows data to move between nodes.

[0003] The managers of such clusters need to understand how the available resources are being delivered to the various users over time and need the ability to have the administrators tune 'cycle delivery' to satisfy the current site mission objectives.

[0004] How well a scheduler succeeds can only be determined if various metrics are established and a means to measure these metrics are available. While statistics are important, their value is limited unless optimal statistical values are also known for the current environment including workload, resources, and policies. If one could determine that a site's typical workload obtained an average queue time of 3 hours on a particular system, this would be a good statistic. However, if one knew that through proper tuning, the system could deliver an average queue time of 1.2 hours with minimal negative side effects, this would be valuable knowledge.

[0005] The present invention was developed to address these issues. At its core, the invention provides a number of software tools designed to truly manage cluster resources and provide meaningful information about what is actually happening on the system. The inventions were created to satisfy real-world needs of a batch system administrator as he or she tries to balance the needs of users, staff, and managers.

BRIEF DESCRIPTION OF THE DRAWINGS

[0006] In order to describe the manner in which the above-recited and other advantages and features of the invention can be obtained, a more particular description of the invention briefly described above will be rendered by reference to specific embodiments thereof which are illustrated in the appended documents and drawings. Understanding that these drawings depict only typical embodiments of the invention and are not therefore to be considered to be limiting of its scope, the invention will be described and explained with additional specificity and detail through the use of the accompanying drawings. These drawings are found in the various documents found in the attached Appendices and will be referred to and explained in the respective document which includes the drawing.

DETAILED DESCRIPTION OF THE INVENTION

[0007] The details of the present invention will be understood with reference to the associated documents attached as Appendix A hereto and further includes a CD according to 37 C.F.R. 1.54(e) and 1.96. There are two copies of the CD (Copy 1 and Copy 2). Each copy contains the same identical set of documents. The enclosed CD Listing of Documents will set forth the documents and folders on the CD with an accompanying explanation of the subject matter of each folder. Each document contained on the CDs is incorporated herein by reference into this patent application.

[0008] The CDs contain a folder 010-0010P2-Provisional-2-CD with seven folders. The Cluster-Resources-Zipped-Software-Package folder contains the 010-0010P-2-Prov-Application.tar zipped file with source code and other documents which may be utilized to create the various software components that comprise the inventions. The other six folders (beans, clustersuite-1.0.7, com-gmoab, moab-4.2.0, moabdocs and webapp) each contain documents unzipped from the 010-0010P-2-Prov-Application.tar file with many of the text documents converted to MSWord to be easily read. Much of the source code (c code and header files) within these folders is contained in wordpad text files.

[0009] Embodiments within the scope of the present invention may also include computer-readable media for carrying or having computer-executable instructions or data structures stored thereon. Such computer-readable media can be any available media that can be accessed by a general purpose or special purpose computer. By way of example, and not limitation, such computer-readable media can comprise RAM, ROM, EEPROM, CD-ROM or other optical disk storage, magnetic disk storage or other magnetic storage devices, or any other medium which can be used to carry or store desired program code means in the form of computer-executable instructions or data structures. When information is transferred or provided over a network or another communications connection (either hardwired, wireless, or combination thereof) to a computer, the computer properly views the connection as a computer-readable medium. Thus, any such connection is properly termed a computer-readable medium. Combinations of the above should also be included within the scope of the computer-readable media.

[0010] Computer-executable instructions include, for example, instructions and data which cause a general purpose computer, special purpose computer, or special purpose processing device to perform a certain function or group of functions. Computer-executable instructions also include program modules that are executed by computers in stand-alone or network environments. Generally, program modules include routines,

programs, objects, components, and data structures, etc. that perform particular tasks or implement particular abstract data types. Computer-executable instructions, associated data structures, and program modules represent examples of the program code means for executing steps of the methods disclosed herein. The particular sequence of such executable instructions or associated data structures represents examples of corresponding acts for implementing the functions described in such steps.

[0011] Those of skill in the art will appreciate that other embodiments of the invention may be practiced in network computing environments with many types of computer system configurations, including personal computers, hand-held devices, multi-processor systems, microprocessor-based or programmable consumer electronics, network PCs, minicomputers, mainframe computers, and the like. Embodiments may also be practiced in distributed computing environments where tasks are performed by local and remote processing devices that are linked (either by hardwired links, wireless links, or by a combination thereof) through a communications network. In a distributed computing environment, program modules may be located in both local and remote memory storage devices.

The Law Office of Thomas M. Isaacson
Intellectual Property Law

APPLICATION DATA SHEET

Applicant Information

Application Type: Provisional
Subject Matter: Utility
CD-ROM or CD-R: Yes
Title: **SYSTEM AND METHOD OF MANAGING
AND MONITORING CLUSTER AND GRID
RESOURCES**
Attorney Docket Number: 010-0010P2
Total Drawing Sheets:
Small Entity: Yes

Applicant Information

Applicant Authority Type: Inventor
Status: Full Capacity
Given Name: David
Middle Name: Brian
Family Name: Jackson
City of Residence: Spanish Fork
County: Utah County
State: Utah
Country of Residence: USA

Correspondence Information

Thomas M. Isaacson
Law Office of Thomas M. Isaacson
850 Lindy Lane
Huntingtown, MD 20639
Ph: 410-414-3056
Fx: 410-510-1433

Related Patent Application Information

Docket No.:	Type:	Parent Application	Filing Date

061804

22783 U.S. PTO

PTO/SB/16 (01-04)

Approved for use through 07/31/2006. OMB 0651-0032

U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

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PROVISIONAL APPLICATION FOR PATENT COVER SHEET

This is a request for filing a PROVISIONAL APPLICATION FOR PATENT under 37 CFR 1.53(c).

Express Mail Label No. ER 357329018 US

17497 U.S. PTO
60/581257

061804

INVENTOR(S)					
Given Name (first and middle [if any])		Family Name or Surname		Residence (City and either State or Foreign Country)	
David Brian		Jackson		Spanish Fork, Utah County, Utah	
Additional inventors are being named on the <u>0</u> separately numbered sheets attached hereto					
TITLE OF THE INVENTION (500 characters max)					
System and Method of Managing and Monitoring Cluster and Grid Resources					
Direct all correspondence to: CORRESPONDENCE ADDRESS					
<input type="checkbox"/> Customer Number: <div style="border: 1px solid black; width: 280px; height: 30px;"></div>					
OR					
<input checked="" type="checkbox"/> Firm or Individual Name		Law Office of Thomas M. Isaacson			
Address		850 Lindy Lane			
Address					
City		Huntingtown	State	MD	Zip 20639
Country		USA	Telephone	410-414-3056	Fax 410-510-1433
ENCLOSED APPLICATION PARTS (check all that apply)					
<input checked="" type="checkbox"/> Specification Number of Pages <u>4</u>		<input checked="" type="checkbox"/> CD(s), Number <u>CD Listing</u>			
<input type="checkbox"/> Drawing(s) Number of Sheets _____		<input checked="" type="checkbox"/> Other (specify) <u>postcard receipt</u>			
<input checked="" type="checkbox"/> Application Data Sheet. See 37 CFR 1.76					
METHOD OF PAYMENT OF FILING FEES FOR THIS PROVISIONAL APPLICATION FOR PATENT					
<input checked="" type="checkbox"/> Applicant claims small entity status. See 37 CFR 1.27.					FILING FEE Amount (\$) <div style="border: 1px solid black; width: 120px; height: 60px; text-align: center; margin-top: 10px;">80.00</div>
<input type="checkbox"/> A check or money order is enclosed to cover the filing fees.					
<input type="checkbox"/> The Director is hereby authorized to charge filing fees or credit any overpayment to Deposit Account Number: _____					
<input checked="" type="checkbox"/> Payment by credit card. Form PTO-2038 is attached.					
The invention was made by an agency of the United States Government or under a contract with an agency of the United States Government.					
<input checked="" type="checkbox"/> No.					
<input type="checkbox"/> Yes, the name of the U.S. Government agency and the Government contract number are: _____					

[Page 1 of 2]

Respectfully submitted,

SIGNATURE

TYPED or PRINTED NAME Thomas M. IsaacsonTELEPHONE 410-414-3056Date June 18, 2004REGISTRATION NO. 44166

(if appropriate)

Docket Number: 010-0010P2**USE ONLY FOR FILING A PROVISIONAL APPLICATION FOR PATENT**

This collection of information is required by 37 CFR 1.51. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 8 hours to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Mail Stop Provisional Application, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of:	:
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David Brian Jackson	: Attorney Ref.: 010-0010P2
	:
Serial No.:	: Confirmation No.:
	:
Filed: June 18, 2004	: Art Unit:
	:
FOR: SYSTEMS AND METHOD OF	: Examiner:
MANAGING AND MONITORING	:
CLUSTER AND GRID RESOURCES	:

37 C.F.R. 1.54(e) CD LISTING OF DOCUMENTS

Mail Stop: Provisional Patent Application
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Dear Sir:

As required by 37 C.F.R. 1.54(e), the attached CDs include the following documents. Each compact disc is created in the IBM-PC format using the MS-Windows XP operating system. The following table provides a list of files with their names, dates of creation, size in bytes and creating program.

The folders referenced below include various files for compiling and operating several software applications, including those known as Moab and Silver. One folder (item 10) contains a zip file with all the documents that can be unzipped and installed for operation. The other folders (items 1 - 9) represent the unzipped information of item 10 in which, where possible, files were converted to MSWord for easy review of the text of the documents. Much of the source code contains in the folders are contained in simple wordpad text files.

CD LISTING OF DOCUMENTS

Item #	Title	Contained in Folder	Size in Bytes	Date of Creation	Doc. Type
1	010-0010P2-Provisional-2-CD	Top Level Folder in CD	120 MB	06/17/2004	Folder
2	Beans This folder contains java code, and MSWord documents, a zip file and other code.	010-0010P2-Provisional-2-CD	92 KB	06/16/2004	Folder
3	clustersuite-1.0.7 This folder contains MSWord documents and a moab folder and a silver folder (see below) containing code for those respective software programs. This folder further contains an autom4te.cache folder containing several MSWord documents.	010-0010P2-Provisional-2-CD	7.19 MB	06/12/2004	Folder
4	moab This folder contains an MSWord documents, source code in various wordpad documents, include files, gif files, html files, etc. needed to operate the Moab software.	010-0010P2-Provisional-2-CD/clustersuite-1.0.7	5.88 MB	6/12/2004	Folder
5	silver This folder contains an MSWord documents, source code in various wordpad documents, include files, gif files, html files, and other files needed to operate the Silver software.	010-0010P2-Provisional-2-CD/clustersuite-1.0.7	1.14 MB	06/12/2004	Folder
6	com-gmoab This folder contains an MSWord documents, source code in various wordpad documents, include files, gif files, html files, and other files needed to operate the Moab software.	010-0010P2-Provisional-2-CD	20.9 MB	06/16/2004	Folder
7	Moab-4.2.0 This folder contains an MSWord documents, source code in various wordpad documents, include files, gif files, html files, and other files needed to operate the Moab software.	010-0010P2-Provisional-2-CD	6.93 MBB	6/12/2004	Folder
8	Moabdocs This folder contains an MSWord documents, source code in various wordpad documents, include files, gif files, html files, and other files needed to operate the Moab software and present information about the software. This folder also includes a "Moab-Access-Portal" folder with documents for operating an access portal.	010-0010P2-Provisional-2-CD	18.2 MB	6/12/2004	Folder
9	Webapp This folder contains an MSWord documents, source code in various wordpad documents, include files, gif files, html files, and other files used to present a web application associated with the Moab software	010-0010P2-Provisional-2-CD	38.5 MB	06/16/2004	Folder
10	Cluster-Resources-Zipped-Software-Package This folder contains a zip file that may be unzipped to include all the source code, html, header, and all other files needed to compile and install Moab and Silver and other software. All items 1 - 9 may be obtained via unzipping this file.	010-0010P2-Provisional-2-CD	28.8 MB	06/16/2004	Folder

Date: June 18, 2004

Correspondence Address:
Law Office of Thomas M. Isaacson
850 Lindy Lane
Huntingtown, MD 20639
Fax: 410-510-1433

Respectfully submitted,

by: 

Thomas M. Isaacson
Attorney for Applicants
Reg. No. 44,166
Phone: (410) 414-3056